

PATENT ABSTRACTS OF JAPAN

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(71)Applicant : NGK SPARK PLUG CO LTD

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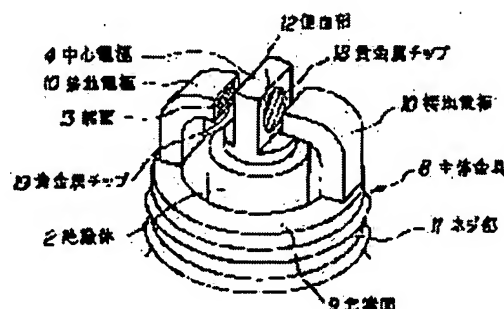
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(54) MANUFACTURE OF SPARK PLUG FOR INTERNAL COMBUSTION ENGINE

(57)Abstract:

PURPOSE: To manufacture a multipolar spark plug excellent in durability to spark consumption in which the spark gap can be easily adjusted.

CONSTITUTION: The side surface part on the top end of a central electrode 3, and an earth electrode 10 opposed to the side surface part are formed into flat surfaces, whereby spark consumption is lowered, and adjustment of the spark gap is facilitated. When an insulator 2 and a main metal fitting 8 are assembled, a centering jig according to the form of the top end part of the central electrode 4 is inserted from the lower part of an assembling jig. Thus, the adjusting process of spark gap after assembling work can be simplified, and by using image processing in the assembling work, the conformation of the side surface part of the central electrode with the end surface of the earth electrode can be precisely and quickly performed.



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CLAIMS

[Claim(s)]

[Claim 1] While forming two or more spark gap sections in the tip lateral portion and earth electrode end face of center-electrode shaft orientations While joining the center electrode which the side face at a tip made the flat side to an insulator in the spark plug for internal combustion engines with which the lateral portion of a center electrode and the end face of an earth electrode which form the above-mentioned spark gap section are a flat side In attaching to the subject metallic ornaments by which the earth electrode which becomes a subject metallic-ornaments apical surface from a nickel alloy etc. beforehand, and makes this insulator a L character configuration was welded The manufacture approach of the spark plug for internal combustion engines which arranges the alignment fixture set by the configuration of the point of a center electrode in the attachment fixture lower part, and it comes to attach to alignment with the lateral portion made into the end face of an earth electrode, and the flat side of a center electrode.

[Claim 2] The manufacture approach of the spark plug for internal combustion engines according to claim 1 which it comes to attach after in attaching the insulator to which the above-mentioned center electrode was joined to the subject metallic ornaments by which it consisted of a nickel alloy etc. and the earth electrode of a L character configuration was welded deducing [of an attachment fixture] a location from the lower part by the image processing and correcting a location.

[Claim 3] The spark plug for internal combustion engines of the flat side of the above-mentioned center electrode, or the end face of the above-mentioned earth electrode according to claim 1 or 2 which comes to join a noble-metals chip to either at least.

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TECHNICAL FIELD

[Industrial Application] This invention relates to the manufacture approach of the spark plug for internal combustion engines, especially the multi-electrode spark plug which comes to form two or more spark gap sections between the lateral portion at the tip of a center electrode, and earth electrodes.

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PRIOR ART

[Description of the Prior Art] Although the parallel pole which forms the spark gap section between a center-electrode tip and an earth electrode was common in the spark plug for internal combustion engines conventionally, the multi-electrode spark plug which comes to form two or more spark gap sections between the lateral portion at the tip of a center electrode and the end faces of an earth electrode has been increasing reservation of endurance, and especially in recent years from a demand called contraction of the cure to breakage of an earth electrode and forward [in an amphoteric electrode], and the discharge voltage difference in negative polarity.

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EFFECT OF THE INVENTION

[Effect of the Invention] The end face of the earth electrode corresponding to the lateral portion at the tip of a center electrode, and this by considering as the so-called multi-electrode type which becomes as a flat side of spark plug for internal combustion engines as above Since spark consumption accompanying spark discharge can be made into the minimum, while being able to raise the endurance as the spark plug itself In manufacture of the above-mentioned spark plug for internal combustion engines, after fitting an alignment fixture in the point of a center electrode from the lower part of an attachment fixture, do an attachment activity, or Furthermore, it has the outstanding effectiveness which can raise the accuracy and the quickness in a production process of a spark plug by it being in charge of this attachment activity, and performing the image processing by the computer.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the manufacture approach of the spark plug for internal combustion engines, especially the multi-electrode spark plug which comes to form two or more spark gap sections between the lateral portion at the tip of a center electrode, and earth electrodes.

[0002]

[Description of the Prior Art] Although the parallel pole which forms the spark gap section between a center-electrode tip and an earth electrode was common in the spark plug for internal combustion engines conventionally, the multi-electrode spark plug which comes to form two or more spark gap sections between the lateral portion at the tip of a center electrode and the end faces of an earth electrode has been increasing reservation of endurance, and especially in recent years from a demand called contraction of the cure to breakage of an earth electrode and forward [in an amphipathy electrode], and the discharge voltage difference in negative polarity.

[0003]

[Problem(s) to be Solved by the Invention] In however, the case of the multi-electrode spark plug which comes to form two or more spark gap sections between the lateral portion at the tip of the center electrode of the above-mentioned former, and the end faces of an earth electrode Since the lateral portion of a center electrode and the end face of an earth electrode which form the spark gap section are formed with the curved surface in both, when it is hard to perform adjustment of a spark gap, the curved surface of the end face of an earth electrode After reserve bending of an earth electrode, since it is necessary to pierce anew and to fabricate, reservation of the shaping top precision of an earth electrode will become difficult. In what is complicated since adjustment of a spark gap is needed again, and makes only the end face of an earth electrode a flat side further Spark discharge in a center electrode is performed in the recently section with the end face of an earth electrode, and endurance over the spark wear in a center electrode and an earth electrode may fully be unable to secure.

[0004] Therefore, the lateral portion made into a flat side in the side face at the tip of a center electrode is prepared. It faces attaching the insulator and subject metallic ornaments by which the center electrode equipped with the lateral portion made into this flat side was joined into the boss. In attaching the insulator and subject metallic ornaments by which a center electrode is fixed, since it is required for physical relationship with the end face of the earth electrode welded to the apical surface of subject metallic ornaments to agree, there is a fault from which it becomes difficult to secure the precision of the alignment.

[0005] Then, this invention cancels the fault which the above-mentioned conventional thing has, by the simple approach, takes endurance and the measures against breakage an advantageous thing, and manufactures the multi-electrode spark plug which forms the spark gap section between the lateral portion which serves as a flat side of a center electrode further, and the end face of an earth electrode.

[0006]

[Means for Solving the Problem] While forming two or more spark gap sections in the lateral portion and earth electrode end face at a tip of center-electrode shaft orientations While joining the center electrode which the side face at a tip made the flat side to an insulator in the spark plug with which the lateral portion of a center electrode and the end face of an earth electrode which form the above-mentioned spark gap section are a flat side In attaching to the subject metallic ornaments by which the earth electrode which becomes a subject metallic-ornaments apical surface from a nickel alloy etc. beforehand, and makes this insulator a L character

configuration was welded To alignment with the lateral portion made into the end face of an earth electrode, and the flat side of a center electrode It arranges and comes to attach the alignment fixture set by the configuration of the point of a center electrode to the attachment fixture lower part. Furthermore, after in attaching the insulator to which the above-mentioned center electrode is joined to the subject metallic ornaments of a L character configuration by which the earth electrode which consists of a nickel alloy etc. was welded deducing [of an attachment fixture] a location from the lower part by the image processing and correcting a location, it comes to attach.

[0007] Furthermore, it is the thing of the flat side of the above-mentioned center electrode, or the end face of the above-mentioned earth electrode which comes to join a noble-metals chip to either at least.

[0008]

[Function] Since the lateral portion at the tip of a center electrode and the end face of an earth electrode which form the spark gap section since it has the above-mentioned configuration are a flat side, adjustment of a spark gap is also easy, and since spark wear is made into the minimum, endurance can also be raised.

[0009] Furthermore, while forming two or more spark gap sections in the lateral portion and earth electrode end face at a tip of the above-mentioned center-electrode shaft orientations The insulator which joins a center electrode when the lateral portion of a center electrode and the end face of an earth electrode which form the above-mentioned spark gap section manufacture the spark plug for internal combustion engines used as a flat side, When attaching the subject metallic ornaments which come to join an earth electrode to an apical surface beforehand While being able to fit in the alignment fixture set by the configuration at the tip of a center electrode at the tip of a center electrode and being able to do an attachment activity efficiently by caulking and attaching from the lower part of an attachment fixture In an attachment activity with the subject metallic ornaments which come to join an earth electrode to the insulator joined to this center electrode, by using an image processing The physical relationship can be corrected, alignment of the lateral portion which serves as a flat side of a center electrode correctly, and the end face of an earth electrode can be performed, and endurance can be raised more by moreover joining a noble-metals chip to a flat side.

[0010]

[Example] The example which shows this invention in drawing explains further. As (1) is a spark plug for internal combustion engines which is the example of this invention and it is shown in drawing 1 and drawing 2 , this spark plug for internal combustion engines (1) While holding a center electrode (4) at the tip of a boss (3) and holding a terminal electrode (5) to the back end While two or more earth electrodes (10) are joined to the insulator (2) which comes to enclose the resistor (7) pinched by a conductive glass seal (6) and (6) in the above-mentioned boss (3) in an apical surface (9) In case an internal combustion engine is equipped in the lower part, it consists of subject metallic ornaments (8) which have the screw section (11) which it comes to screw to a plughole.

[0011] And the end face (13) of the lateral portion (12) of the shaft orientations of a center electrode (4), (12), the lateral portion (12) of the center electrode (4) which forms two or more spark gap sections (14) and (14) in the end face (13) of an earth electrode (10) and (13), and forms the above-mentioned spark gap section (14) and (14) and (12), and an earth electrode (10) and (13) are a flat side. Furthermore, in order to raise endurance, the end face (13) of a noble-metals chip (18) and/or an earth electrode (10) is joined to the lateral portion (12) of the center electrode (4) which forms the above-mentioned spark gap section (14) and (14), and (12), and it comes to join a noble-metals chip (19) to (13).

[0012] As moreover shown in drawing 4 and drawing 5 , while joining the center electrode (4) which has the lateral portion (12) made into the flat side on the side face at a tip to an insulator (2) It becomes the apical surface (9) of subject metallic ornaments (8) from a nickel alloy etc. beforehand about this insulator (2). In attaching to the subject metallic ornaments (8) by which the earth electrode (10) made into a L character configuration was welded To alignment with the lateral portion (12) made into the end face (13) of an earth electrode (10), and the flat side of a center electrode (4) In the lower part of an attachment fixture (15), the alignment fixture (17) set by the configuration of the point of a center electrode (4) is arranged. It is the thing which pressurizes a caulking fixture (16), and presses and comes to attach the annular trailing-edge edge (20) of subject metallic ornaments (8) to the inner direction. Moreover, in attaching the insulator (2) to which the above-mentioned center electrode (4) is joined to the subject metallic ornaments (8) of a L character configuration by which the earth electrode (10) which consists of a nickel alloy etc. is welded physical

relationship with the end face (13) which turns into [of an attachment fixture (15)] a lateral portion (12) made into the flat side of the side face of a center electrode (4) by the image processing (21), and a flat side of an earth electrode (10) from the lower part -- deducing -- correction of a location -- giving -- the same -- ** -- it constructs in total and is so-called *****.

[0013] Since the lateral portion (12) of a center electrode (4) and the end face (13) of an earth electrode (10) which form the spark gap section (14) since this invention is equipped with the above configuration are a flat side mutually Adjustment of a spark gap is also easy and spark wear of the lateral portion (12) of the center electrode (4) generated in connection with spark discharge and the end face (13) of an earth electrode (10) can also be made into the minimum thing. By and the thing for which spark consumption joins little noble-metals chip (18) to the lateral portion (12) of a center electrode (4), or the end face (13) of an earth electrode (10) at least in one side of a noble-metals chip (19) The endurance over spark consumption of the spark plug for internal combustion engines (1) can also be raised.

[0014] Moreover, while forming two or more spark gap sections (14) and (14) between the end face (13) of the lateral portion (12) of the shaft orientations of the above-mentioned center electrode (4), (12), an earth electrode (10), and (10), and (13) The lateral portion (12) of the center electrode (4) which forms the above-mentioned spark gap section (14) and (14), the end face (13) of an earth electrode (10) and (10), and (13) are a flat side. The insulator to which a center electrode (4) is joined in manufacturing the so-called multi-electrode type of spark plug for internal combustion engines (1) (2), When the earth electrode (10) which consists of a nickel alloy etc. beforehand, and (10) attach the subject metallic ornaments (8) joined to an apical surface (9) After positioning by fitting in the alignment fixture (17) set by the configuration of the point (16) of a center electrode (4) at the tip of a center electrode (4), and carrying out it from the lower part of an attachment fixture (15) While being able to do efficiently an attachment activity with the subject metallic ornaments (8) by which an earth electrode (10) is joined to the insulator (2) to which it attaches and a center electrode (4) is joined correctly It becomes possible as a thing equivalent to a plug gap [in / for the thickness of this alignment fixture (17) / a finished product] to simplify the production process of the spark plug for internal combustion engines of the multi-electrode mold of this invention (1) (drawing 3 , drawing 4).

[0015] In an attachment activity with the subject metallic ornaments (8) by which an earth electrode (10) is joined to the insulator (2) to which this center electrode (4) is joined, by and the thing using image processings (21), such as lighting by the computer, and a camera By rotating and correcting the insulator (2) which joins a center electrode (4) for the physical relationship of the lateral portion (12) which is the flat side of the center electrode (4) to the end face (13) of the earth electrode (10) Alignment with the end face (13) of the lateral portion (12) and earth electrode (10) which serve as a flat side of a center electrode (4) correctly and quickly can be performed (the drawing 5 (**), (**)).

[0016] In addition, since the end face (13) of the earth electrode (10) corresponding to the lateral portion (12) of a center electrode (4) and the lateral portion (12) of this center electrode (4) should just form the spark gap section (14) as a flat side mutually, as shown in drawing 6 The configuration of the point of a center electrode (4) may be made into the shape of the triangle pole, and the end face (13') of an earth electrode (10) may be arranged corresponding to each lateral portion (12').

[0017] Then, the thing which made the flat side the lateral portion (12) of a center electrode (4), and the end face (13) of an earth electrode (10) like the example of this invention, Two or more spark gap sections are formed between the lateral portion of the conventional center electrode, and the end face of an earth electrode. Between the multi-electrode spark plugs (conventional example) which become as a flat side, only the end face of the multi-electrode spark plug (conventional example A) with which the lateral portion of a center electrode and the end face of an earth electrode are mutually constituted with a curved surface, and an earth electrode When the durability test was performed, the effectiveness that the example of this invention had the low rate of increase of the spark gap section (14) to time amount compared with the thing of the conventional example, and the endurance over the spark consumption generated in connection with spark discharge improved was accepted (drawing 7).

[0018]

[Effect of the Invention] The end face of the earth electrode corresponding to the lateral portion at the tip of a center electrode, and this by considering as the so-called multi-electrode type which becomes as a flat side of spark plug for internal combustion engines as above Since spark consumption accompanying spark discharge

can be made into the minimum, while being able to raise the endurance as the spark plug itself In manufacture of the above-mentioned spark plug for internal combustion engines, after fitting an alignment fixture in the point of a center electrode from the lower part of an attachment fixture, do an attachment activity, or Furthermore, it has the outstanding effectiveness which can raise the accuracy and the quickness in a production process of a spark plug by it being in charge of this attachment activity, and performing the image processing by the computer.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] In however, the case of the multi-electrode spark plug which comes to form two or more spark gap sections between the lateral portion at the tip of the center electrode of the above-mentioned former, and the end faces of an earth electrode Since the lateral portion of a center electrode and the end face of an earth electrode which form the spark gap section are formed with the curved surface in both, when it is hard to perform adjustment of a spark gap, the curved surface of the end face of an earth electrode After reserve bending of an earth electrode, since it is necessary to pierce anew and to fabricate, reservation of the shaping top precision of an earth electrode will become difficult. In what is complicated since adjustment of a spark gap is needed again, and makes only the end face of an earth electrode a flat side further Spark discharge in a center electrode is performed in the recently section with the end face of an earth electrode, and endurance over the spark wear in a center electrode and an earth electrode may fully be unable to secure.

[0004] Therefore, the lateral portion made into a flat side in the side face at the tip of a center electrode is prepared. It faces attaching the insulator and subject metallic ornaments by which the center electrode equipped with the lateral portion made into this flat side was joined into the boss. In attaching the insulator and subject metallic ornaments by which a center electrode is fixed, since it is required for physical relationship with the end face of the earth electrode welded to the apical surface of subject metallic ornaments to agree, there is a fault from which it becomes difficult to secure the precision of the alignment.

[0005] Then, this invention cancels the fault which the above-mentioned conventional thing has, by the simple approach, takes endurance and the measures against breakage an advantageous thing, and manufactures the multi-electrode spark plug which forms the spark gap section between the lateral portion which serves as a flat side of a center electrode further, and the end face of an earth electrode.

[Translation done.]

JAPANESE [JP,07-057849,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION
TECHNICAL PROBLEM MEANS OPERATION EXAMPLE DESCRIPTION OF DRAWINGS DRAWINGS

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OPERATION

[Function] Since the lateral portion at the tip of a center electrode and the end face of an earth electrode which form the spark gap section since it has the above-mentioned configuration are a flat side, adjustment of a spark gap is also easy, and since spark wear is made into the minimum, endurance can also be raised.

[0009] Furthermore, while forming two or more spark gap sections in the lateral portion and earth electrode end face at a tip of the above-mentioned center-electrode shaft orientations The insulator which joins a center electrode when the lateral portion of a center electrode and the end face of an earth electrode which form the above-mentioned spark gap section manufacture the spark plug for internal combustion engines used as a flat side, When attaching the subject metallic ornaments which come to join an earth electrode to an apical surface beforehand While being able to fit in the alignment fixture set by the configuration at the tip of a center electrode at the tip of a center electrode and being able to do an attachment activity efficiently by caulking and attaching from the lower part of an attachment fixture In an attachment activity with the subject metallic ornaments which come to join an earth electrode to the insulator joined to this center electrode, by using an image processing The physical relationship can be corrected, alignment of the lateral portion which serves as a flat side of a center electrode correctly, and the end face of an earth electrode can be performed, and endurance can be raised more by moreover joining a noble-metals chip to a flat side.

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EXAMPLE

[Example] The example which shows this invention in drawing explains further. As (1) is a spark plug for internal combustion engines which is the example of this invention and it is shown in drawing 1 and drawing 2, this spark plug for internal combustion engines (1) While holding a center electrode (4) at the tip of a boss (3) and holding a terminal electrode (5) to the back end While two or more earth electrodes (10) are joined to the insulator (2) which comes to enclose the resistor (7) pinched by a conductive glass seal (6) and (6) in the above-mentioned boss (3) in an apical surface (9) In case an internal combustion engine is equipped in the lower part, it consists of subject metallic ornaments (8) which have the screw section (11) which it comes to screw to a plughole.

[0011] And the end face (13) of the lateral portion (12) of the shaft orientations of a center electrode (4), (12), the lateral portion (12) of the center electrode (4) which forms two or more spark gap sections (14) and (14) in the end face (13) of an earth electrode (10) and (13), and forms the above-mentioned spark gap section (14) and (14) and (12), and an earth electrode (10) and (13) are a flat side. Furthermore, in order to raise endurance, the end face (13) of a noble-metals chip (18) and/or an earth electrode (10) is joined to the lateral portion (12) of the center electrode (4) which forms the above-mentioned spark gap section (14) and (14), and (12), and it comes to join a noble-metals chip (19) to (13).

[0012] As moreover shown in drawing 4 and drawing 5, while joining the center electrode (4) which has the lateral portion (12) made into the flat side on the side face at a tip to an insulator (2) It becomes the apical surface (9) of subject metallic ornaments (8) from a nickel alloy etc. beforehand about this insulator (2). In attaching to the subject metallic ornaments (8) by which the earth electrode (10) made into a L character configuration was welded To alignment with the lateral portion (12) made into the end face (13) of an earth electrode (10), and the flat side of a center electrode (4) In the lower part of an attachment fixture (15), the alignment fixture (17) set by the configuration of the point of a center electrode (4) is arranged. It is the thing which pressurizes a caulking fixture (16), and presses and comes to attach the annular trailing-edge edge (20) of subject metallic ornaments (8) to the inner direction. Moreover, in attaching the insulator (2) to which the above-mentioned center electrode (4) is joined to the subject metallic ornaments (8) of a L character configuration by which the earth electrode (10) which consists of a nickel alloy etc. is welded physical relationship with the end face (13) which turns into [of an attachment fixture (15)] a lateral portion (12) made into the flat side of the side face of a center electrode (4) by the image processing (21), and a flat side of an earth electrode (10) from the lower part -- deducing -- correction of a location -- giving -- the same -- ** -- it constructs in total and is so-called *****.

[0013] Since the lateral portion (12) of a center electrode (4) and the end face (13) of an earth electrode (10) which form the spark gap section (14) since this invention is equipped with the above configuration are a flat side mutually Adjustment of a spark gap is also easy and spark wear of the lateral portion (12) of the center electrode (4) generated in connection with spark discharge and the end face (13) of an earth electrode (10) can also be made into the minimum thing. By and the thing for which spark consumption joins little noble-metals chip (18) to the lateral portion (12) of a center electrode (4), or the end face (13) of an earth electrode (10) at least in one side of a noble-metals chip (19) The endurance over spark consumption of the spark plug for internal combustion engines (1) can also be raised.

[0014] Moreover, while forming two or more spark gap sections (14) and (14) between the end face (13) of the lateral portion (12) of the shaft orientations of the above-mentioned center electrode (4), (12), an earth electrode (10), and (10), and (13) The lateral portion (12) of the center electrode (4) which forms the above-mentioned

spark gap section (14) and (14), the end face (13) of an earth electrode (10) and (10), and (13) are a flat side. The insulator to which a center electrode (4) is joined in manufacturing the so-called multi-electrode type of spark plug for internal combustion engines (1) (2), When the earth electrode (10) which consists of a nickel alloy etc. beforehand, and (10) attach the subject metallic ornaments (8) joined to an apical surface (9) After positioning by fitting in the alignment fixture (17) set by the configuration of the point (16) of a center electrode (4) at the tip of a center electrode (4), and carrying out it from the lower part of an attachment fixture (15) While being able to do efficiently an attachment activity with the subject metallic ornaments (8) by which an earth electrode (10) is joined to the insulator (2) to which it attaches and a center electrode (4) is joined correctly It becomes possible as a thing equivalent to a plug gap [in / for the thickness of this alignment fixture (17) / a finished product] to simplify the production process of the spark plug for internal combustion engines of the multi-electrode mold of this invention (1) (drawing 3 , drawing 4).

[0015] In an attachment activity with the subject metallic ornaments (8) by which an earth electrode (10) is joined to the insulator (2) to which this center electrode (4) is joined, by and the thing using image processings (21), such as lighting by the computer, and a camera By rotating and correcting the insulator (2) which joins a center electrode (4) for the physical relationship of the lateral portion (12) which is the flat side of the center electrode (4) to the end face (13) of the earth electrode (10) Alignment with the end face (13) of the lateral portion (12) and earth electrode (10) which serve as a flat side of a center electrode (4) correctly and quickly can be performed (the drawing 5 (**), (**)).

[0016] In addition, since the end face (13) of the earth electrode (10) corresponding to the lateral portion (12) of a center electrode (4) and the lateral portion (12) of this center electrode (4) should just form the spark gap section (14) as a flat side mutually, as shown in drawing 6 The configuration of the point of a center electrode (4) may be made into the shape of the triangle pole, and the end face (13') of an earth electrode (10) may be arranged corresponding to each lateral portion (12').

[0017] Then, the thing which made the flat side the lateral portion (12) of a center electrode (4), and the end face (13) of an earth electrode (10) like the example of this invention, Two or more spark gap sections are formed between the lateral portion of the conventional center electrode, and the end face of an earth electrode. Between the multi-electrode spark plugs (conventional example) which become as a flat side, only the end face of the multi-electrode spark plug (conventional example A) with which the lateral portion of a center electrode and the end face of an earth electrode are mutually constituted with a curved surface, and an earth electrode When the durability test was performed, the effectiveness that the example of this invention had the low rate of increase of the spark gap section (14) to time amount compared with the thing of the conventional example, and the endurance over the spark consumption generated in connection with spark discharge improved was accepted (drawing 7).

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the expanded sectional view of the example of this invention.

[Drawing 2] It is the expansion perspective view of the point of the spark plug which is the example of this invention.

[Drawing 3] It is a sectional view in an attachment activity with the insulator and subject metallic ornaments in the production process of a spark plug.

[Drawing 4] It is the important section expansion perspective view.

[Drawing 5] It is drawing showing the attachment activity using an image processing, and (b) is the expanded sectional view and (b) is drawing showing the condition of correction.

[Drawing 6] It is the expansion perspective view of the spark plug which is the example of others in this invention.

[Drawing 7] It is drawing showing the result in a durability test.

[Description of Notations]

1 Spark Plug for Internal Combustion Engines

2 Insulator

3 Boss

4 Center Electrode

5 Terminal Electrode

6 Conductive Glass Seal

7 Resistor

8 Subject Metallic Ornaments

9 Apical Surface

10 Earth Electrode

11 Screw Section

12 Lateral Portion of Center Electrode

13 End Face of Earth Electrode

14 Spark Gap Section

15 Attachment Fixture

16 Caulking Fixture for Attachment

17 Alignment Fixture

18 19 Noble-metals chip

20 Back End Edge

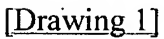
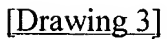
21 Image Processing

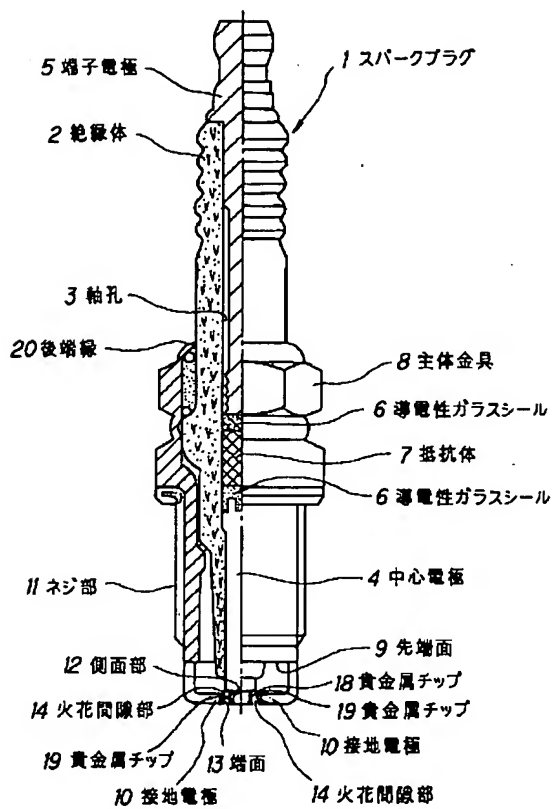
[Translation done.]

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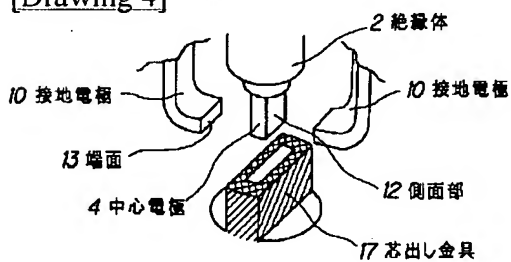
- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

[Drawing 2]



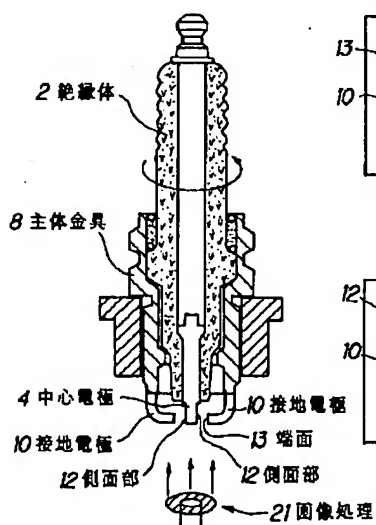


[Drawing 4]

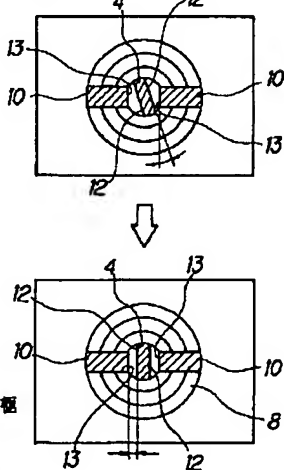


[Drawing 5]

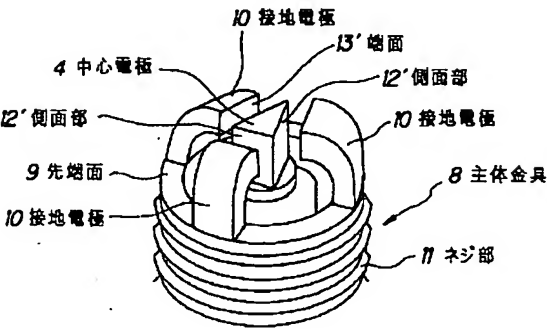
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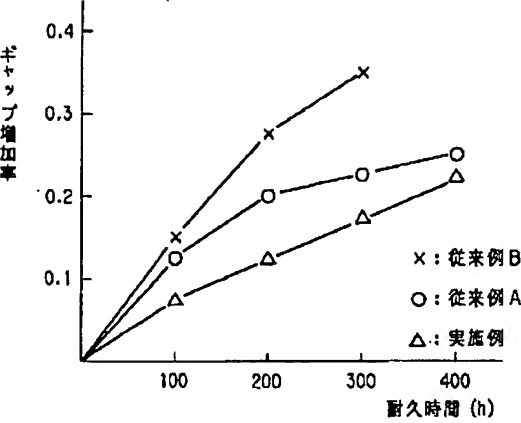
(ロ)



[Drawing 6]



[Drawing 7]



[Translation done.]